ABSTRACTS

(This section of the JOURNAL *is published in collaboration with the two abstracting journals, Abstracts of World Medicine, and Abstracts of World Surgery, Obstetrics, and Gynæcology, published by the British Medical Association. The abstracts are divided into the following sections : syphilis (general, therapeutic, pathology) ; gonorrhœa (general, therapeutic, pathology) ; other venereal disease conditions ; public health. After each subsection of abstracts follows a list of articles that have been noted but not abstracted. All subsections will not necessarily be represented in each issue.)*

SYPHILIS (Therapeutic)

The Effect of Hyperpyrexia on the Therapeutic Efficacy of Penicillin in Experimental Syphilis. EAGLE, H., MAGNUSON, H. J., and FLEISCHMAN, R. (1947). *Amer. J. Syph.*, **31**, 239.

Eagle and Musselman have already shown that the rate at which cultured strains of *Treponema pallidum* are killed by penicillin *in vitro* increases with temperature between 8° and 40° C. In the present study rabbits were inoculated intratesticularly with *T. pallidum* contained in an emulsion prepared from acute testicular syphilomata. Infection was confirmed by dark-ground examination 5 to 6 months later, and 37 rabbits were treated with varying doses of penicillin in an electrically heated fever box. The rectal temperatures of the animals varied from 102° to 108° F., the fever being maintained for 10 hours. Two animals were treated with fever alone. The results were as follows :

Total Penicillin (units/kg.)	Mean Total Hours of Fever	No. of Rabbits		Percentage Cured *
		Cured	Failed	
32,000	42	4	0	100
16,000	47	4	1	94
8,000	46	4	0	92
4,000	45	4	3	67
2,000	43	2	4	33
1,000	34	2	3	15
500	44	0	5	0
Fever alone, no penicillin	34	0	2	0

*Calculated by method of Reed and Muench.

The efficacy of sodium penicillin alone was tested on 34 rabbits, with the following results :

Total Penicillin (units/kg.)	No. of Rabbits		Percentage Cured *
	Cured	Failed	
64,000	5	1	91
32,000	2	4	56
16,000	0	4	25
8,000	2	3	20
4,000	1	5	6
2,000	0	3	0
1,000	0	4	0

*Calculated by method of Reed and Muench.

Tests of cure consisted of lymph-node transfers 6 months after treatment, intratesticular inoculations being made with saline extracts of the animals' popliteal lymph nodes. The newly inoculated rabbits were examined at weekly intervals for approximately 90 days, after which time, if no orchitis had developed, the testes were removed, emulsified, and subjected to dark-ground examination.

The authors conclude that in the rabbit the spirochæticidal action of penicillin can be increased from eight to ten times when it is administered with a 10-hour fever session, and that fever may have a spirochæticidal action which is either additive to or synergistic with that of penicillin. *G. L. M. McElligott*

Observations on the Therapeutic Efficacy in Experimental Syphilis of Calcium Penicillin in Oil and Beeswax and their Bearing on its Use in Man. EAGLE, H., MAGNUSON, H. J., and FLEISCHMAN, R. (1947). *Amer. J. Syph.*, **31**, 246.

These experiments were undertaken to show that a single injection of penicillin in beeswax-oil suspension resulting in a prolonged low blood level was more effective in experimental syphilis in the rabbit than a

single injection of an aqueous solution and as effective as multiple small injections. The effect of different concentrations of beeswax in oily penicillin is also studied, as well as the optimum method of administering oil-wax preparations in experimental syphilis.

The rabbits were treated 5 to 7 weeks after intratesticular inoculation, proof of cure being confirmed by popliteal lymph-node transfers into two normal animals 6 months after treatment. Suspensions of calcium penicillin in peanut oil were prepared containing: (*a*) no beeswax; (*b*) beeswax 3% by volume; (*c*) beeswax 6% by volume, the infected rabbits receiving four successive daily injections of the different preparations. The total dosage of penicillin necessary to cure 50% of the animals fell from 39,000 to 8,000 to 3,500 units per kilo of body weight as the concentration of beeswax was increased from 0 to 3 to 6% by volume. The dosage necessary to cure 90% of the animals fell correspondingly from 80,000 to 16,000 to 8,000 units per kilo. Oily suspensions of penicillin without beeswax were only slightly more effective than aqueous solutions similarly administered.

The effect of five different schemes of treatment with penicillin in oil and beeswax is shown in one table and the relative therapeutic efficacy of penicillin in aqueous solution and in oil-wax suspension in another table. It is noteworthy that the superiority of the oil-wax preparations over the watery solution becomes less marked when treatment is prolonged, and that the margin of difference between the two preparations narrows as the number of injections is increased and the dose of penicillin per injection is decreased. High penicillin blood levels do not appear to be necessary for the cure of syphilis, and as would be expected, the maximum wastage of penicillin occurs with large injections of an aqueous solution. The authors conclude that their observations in animals would probably find a parallel in the treatment of human syphilis or acute bacterial infections.

[This important paper should be read in the original.]

G. L. M. McElligott

The Serologic Response Following Penicillin Therapy for Early Syphilis. CLARK, E. G., MAXWELL, R. W., and SCOTT, V. (1947). *Amer. J. med. Sci.*, **213**, 535.

The authors do not measure the therapeutic adequacy of penicillin by the disappearance time of *Treponema pallidum* from superficial lesions or by the rapidity of healing of syphilitic affections, but by a comparison of the serological response after penicillin with the previously published observations on patients with early syphilis under arsenical therapy. Quantitative blood titres were estimated by the Kahn technique and recorded in Kahn units on 208 patients with previously untreated primary or secondary syphilis. After the completion of penicillin therapy the blood reactions were tested at fortnightly intervals for the first 3 months and monthly thereafter for 1 year. Patients who developed a clinical or a confirmed serological relapse were not included. The varying potency of the three schedules of penicillin used (1,600,000 units in 10 days, 1,200,000 units in 3¾ days, and 4,800,000 units in 7½ days) was also unimportant, since no apparent difference occurred in the serological response with total dosages ranging from 300,000 to 1,200,000 units. The sodium salt exclusively employed was injected intramuscularly in equally divided doses every 3 hours.

The comparative serological responses are shown in graphs. Those observed during the first 8 weeks after penicillin therapy are comparable with those previously reported during weekly treatment with the various arsenical drugs. As some of these are known to be therapeutically inferior to penicillin, possibly the serological response is not an all-important criterion of the therapeutic efficiency in the final evaluation of antisyphilitic drugs.

In serum-positive primary syphilis, although the serological response may be slightly slower with penicillin than with the arsenicals, the figures are identical at the end of 4 weeks and remain essentially the same at the end of 8 weeks. In early secondary syphilis the decline in serum titre after penicillin administration is retarded until the sixth week. In late secondary syphilis the titre at the end of 8 weeks of the penicillin-treated group declined only 50% compared with an 85% fall in patients receiving arsenic. During the first year the figures confirm the well-known relation between the duration of the disease before treatment and the serological rate of fall: the longer the duration of infection the slower the serological response. After penicillin serum-positive primary cases required 16 weeks to become permanently serum-negative, early secondary cases took 24 weeks, and late secondary cases 36 weeks. In general, these results correspond with those observed during arsenical treatment. Abnormal cerebrospinal-fluid findings revealed the presence of early neurosyphilis in 62 patients. This condition did not apparently retard the rate of fall of their blood-reactions following penicillin.

T. Anwyl-Davies

Treatment of Early Acquired Syphilis with 600,000 units of Sodium Penicillin. SMITH, D. C., KAUFMAN, W. H., and SHAFER, J. C. (1947). *Arch. Derm. Syph. Chicago*, **55**, 644.

Thirty-four patients, 2 with serum-negative, 8 with serum-positive primary syphilis, and 24 with secondary syphilis, received a total of 600,000 units of different brands of commercial sodium penicillin in saline solution; it was administered in thirty 3-hourly intramuscular injections. All the patients have been studied for at least a year, 29 for 18 months, 20 for 21 months, and 14 for 2 years or more. There were 21 female and 30 negro patients.

A Herxheimer reaction was obtained in 13 and there were no toxic effects. In 8 cases observed *Treponema pallidum* disappeared from the initial lesions in 8 to 23 hours. Chancres healed in 12 to 47 days and secondary lesions in 10 to 56 days, although in 1 case lesions persisted until a relapse after 97 days. The 2 patients with serum-negative primary syphilis were still in a satisfactory condition after 548 and 760 days respectively. Seven of the 8 serum-positive primary patients were well after 419 to 715 days, but there was 1 with mucocutaneous lesions at 124 days. Ten of the 24 secondary cases also relapsed; 7 with mucocutaneous lesions at 97 to 347 days (average 209 days) and 3 with serological relapses at 135 to 376 days. Five of these relapses occurred at periods under 6 months and the remainder after that time. In addition 3 other patients still show some degree of serum-resistance after 383 to 627 days. Thus, only 20 (58·8%) are regarded as showing favourable results.

R. R. Willcox

General Paralysis of the Insane treated with Penicillin. Report on 7 Cases. SMITH, R. H. F. (1947). *Lancet*, **1**, 665.

Seven patients with general paralysis were treated with calcium penicillin by the intramuscular route. The maximum dosage in one course was 2,400,000 units.

Four patients received 20,000 units 3-hourly day and night to a total of 1,280,000 units, followed at an interval of a month or longer by a second course of 50,000 units 4-hourly day and night to a total of 2,400,000. Two patients were given two courses of 50,000 units 4-hourly day and night to a total of 2,400,000, followed by a second course a month after the end of the first. One patient had one course of treatment totalling 2,400,000 units. No penicillin was found in the spinal fluid after this dosage. Febrile reactions were observed in 2 cases. One patient developed an urticarial skin rash. Jarisch-Herxheimer reactions were observed in 2 cases, 1 of them in association with the skin rash mentioned. A decrease in cells in the cerebrospinal fluid and a lowered protein content were early features. The cell count became normal in 5 cases. The colloidal-gold reaction revealed little change. The Wassermann reaction in the fluid remained unchanged in 5 cases within the period of observation and in the 2 others showed little change. In 5 cases the blood Wassermann remained unaltered after two courses of treatment. In 1 case it had become negative 12 months after treatment. Four patients made a " social recovery " and were at work 11, 12, 10, and 13 months respectively after treatment. One has greatly improved, 1 is unimproved, and 1 died.

E. W. Anderson

SYPHILIS (Pathology)

Biologic False Positive Reaction in Serologic Tests for Syphilis. I. Preparation and Properties of Serologically Active Serum Globulin Fractions Obtained by Fractional Precipitation with Ammonium Sulfate. NEURATH, H., VOLKIN, E., ERICKSON, J. O., CRAIG, H. W., PUTNAM, F. W., and COOPER, G. R. (1947). *Amer. J. Syph.*, **31**, 347.

The authors say that the conditions most commonly liable to produce biological false positive reactions are upper respiratory infections, smallpox vaccination, infectious mononucleosis, measles, atypical pneumonia, and lymphogranuloma venereum ; other possible conditions such as malaria, leprosy, typhus, filariasis, and Weil's disease, are less prevalent in the U.S.A. Treponemal diseases, such as yaws, bejel, and pinta, are so closely allied to syphilis that the positive reaction which they give is to be considered as " syphiloid " and not false. There remain those rare individuals whose sera give positive reactions without any apparent cause. Three possible hypotheses have been evoked to account for biological false positive reactions : (1) They are due to the formation of antibodies immunologically identical with those of syphilis. (2) The antibodies are different but cross-reactive with all known antigens. (3) They are not true antigen-antibody reactions but rather non-specific reactions with the antigen of some serum-protein component of unknown origin ; this last appears to be the least likely. Verification tests as known at present are considered unreliable.

The object of this investigation was to discover whether the sera from syphilitic patients differ chemically or immunologically from those which give false positive reactions, and the emphasis is therefore on the specificity of antibodies rather than antigens ; the two methods employed consisted of fractional precipitation with ammonium sulphate and isoelectric precipitation at low salt concentrations. Sera were obtained from patients with syphilis and from persons known to give biological false positive reactions, either due to some morbid condition or entirely inexplicable : all sera were heated to 63° C. ±1° for 3 minutes preceding analysis. Results showed that in the case of sera from syphilitic patients fractions G I precipitated by 1·4 M ammonium sulphate, and G II by 1·7 M ammonium sulphate, contain much more antibody than fraction G III precipitated by 1·7 to 2·1 M ammonium sulphate, this last being almost inactive, as was the crude albumin component remaining ; the sum total of the fractions was nearly always less than that of whole serum in the case of syphilitics, whereas in the case of biological false positive sera it was often greater. Electrophoretic analyses revealed that the serological titre of the fractions corresponded roughly to their gamma-globulin content, but the fractions themselves were not significantly different in syphilitics, persons with other diseases, and normal subjects. Sera from the last two classes appeared to be more susceptible to heat inactivation than those from syphilitics, but this line of research was not considered worthy of further trial. The fact that there is a concomitant increase in total titre in biological false positive reactions but not in true positives appears to be significant.

[There are 53 references, all but two of which are to American literature. No mention is made of the work of Sachs.] *T. E. Osmond*

Biologic False Positive Reactions in Serologic Tests for Syphilis. II. Preparation and Properties of Serologically Active Serum Euglobulin Fractions Obtained by Isoelectric Precipitation. ERICKSON, J. O., VOLKIN, E., CRAIG, H. W., COOPER, G. R., and NEURATH, H. (1947). *Amer. J. Syph.*, **31**, 374.

Experiments on the euglobulin fractions isolated by isoelectric precipitation from syphilitic and biological false positive sera are reported. Two methods were employed : (1) the use of carbon-dioxide gas bubbled through diluted serum, and (2) addition of dilute hydrochloric acid. In the case of syphilitic sera it was found that about half the original serum titre was in the euglobulin fraction, whereas in the case of biological false positive sera the euglobulins had a higher titre than whole sera ; this latter finding is not considered unique but is probably significant. The amount of protein in the euglobulin fraction is about 7% of the total serum proteins, so that if these contain 50% of the total antibodies the latter are concentrated about seven times in the euglobulin.

Electrophoretic measurements of the euglobulin fractions showed that 50% of the protein is in the form of gamma globulins ; these contain most of the antibodies, whereas beta globulin contains little or none ; more antibodies were found in the faster-moving " half " of the gamma globulin than in whole gamma globulin or in its more slowly moving " half." This applies equally to both syphilitic and false positive sera.

T. E. Osmond

Biologic False Positive Reactions in Serologic Tests for Syphilis. III. Preparation and Properties of Serum Protein Fractions which Inhibit Biologic False Positive Reactions. VOLKIN, E., NEURATH, H., ERICKSON, J. O., and CRAIG, H. W. (1947). *Amer. J. Syph.*, **31**, 397.

Preliminary tests showed that crude albumin obtained from the serum of a patient with leprosy inhibited the serological activity of globulins from biological false positive sera, but had little or no effect on those obtained from syphilitic sera. Further experiments showed that this crude albumin fraction is present in more than half of all human sera, whether emanating from normal, syphilitic, or biological false positive sera ; incidentally it was found that sera from patients with liver disease

did not contain the inhibitor. This inhibitory activity appears not to be present in whole human serum or in the serum of various animals, but is present occasionally in fraction G III of human serum globulin, and more often in fraction IV–1 and euglobulin III–0 of human plasma. Fraction IV–1 is a lipoprotein containing about 7% cholesterol and 2·2% carbohydrate. Electrophoretic analysis revealed 11% albumin, 73% alpha 1 and 10% alpha 2 globulins, and 6% beta globulin. The euglobulin component has a relatively high content of X protein and consists mostly of beta globulins. Similar fractions from cow and pig sera were relatively inactive. The inhibitory factor appears to be insensitive to heat, withstanding heat coagulation or a temperature of 56° C. for 40 hours, loses some of its activity when extracted with fat solvents, and can be completely removed by adsorption on cholesterol crystals. The chemical nature of this inhibitor has not been determined but it is clear that it must be associated with a high molecular weight compound, is a heat-stable protein, and is probably associated with the alpha globulins. Crystalline human serum albumin has no inhibitory activity.

T. E. Osmond

Biologic False Positive Reactions in Serologic Tests for Syphilis. IV. Quantitative Aspects of the Inhibition Phenomenon. VOLKIN, E., NEURATH, H., and CRAIG, H. W. (1947). *Amer. J. Syph.*, **31**, 413.

Investigations were carried out to determine the influence of the inhibition phenomenon (see above abstract) and to try to explain the mechanism of the reaction in biological false positive sera. The antigens employed were the same as in previous experiments—Mazzini, Kline, Kahn, and cardiolipin; serum euglobulin fractions were prepared by the hydrochloric acid method, globulin fractions G I and G II by precipitation with ammonium sulphate; the buffer was phosphate-saline and the inhibitor was that described in the following abstract. Within a wide but definite range of concentration, inhibition occurred with biological false positive sera but not with syphilitic sera.

In the second series of experiments either the buffer or the inhibitor was used as diluent; where the concentration of inhibitor is above a certain level there is some inhibition in both true and false positive sera, while below a certain level inhibition is incomplete with false positive sera. When inhibitor was used as diluent it was noted that the selective inhibition was unrelated to antibody titre and that the degree of inhibition depended on inhibitor : antigen ratios. Increasing amounts of antigen cause a decrease in the extent of inhibition; the minimum inhibitor concentration required for complete inhibition increases with increasing amounts of antigen.

Further experiments showed that it made no difference what order was observed in mixing the reagents: inhibitor added after flocculation caused redispersion of the flocculi, while addition of inhibitor to antigen before addition of the antibodies resulted in complete inhibition. When the euglobulin fractions of true and false positive sera were mixed it was found that inhibition was directed solely toward the false positive antibodies. the final titre being that of the true positive only, and not the sum of the two. Similarly the final titre when true antibody was added to a mixture of false positive antibody, inhibitor, and antigen was that of the original syphilitic antibody, and the same result was obtained when syphilitic antibodies were added to the flocculi of false positive antibodies and antigen previously dispersed by inhibitor. These observations suggest a method of preparation of antigens which should be specific for syphilis.

T. E. Osmond

Biologic False Positive Reactions in Serologic Tests for Syphilis. V. A Preliminary Survey Analysis with the Euglobulin-inhibition Method for the Serologic Differentiation between True and Biologic False Positive Reactions. NEURATH, H., VOLKIN, E., CRAIG, H. W., and ERICKSON, J. O. (1947). *Amer. J. Syph.*, **31**, 436.

Experiments were carried out to estimate the value of the euglobulin inhibition test as a means of distinguishing true from false positive reactions for syphilis. The following types and numbers of sera were tested: (1) Of 409 biological false positive sera 285 had positive euglobulin fractions, and 92% of these gave a biological false positive inhibition reaction and 2% a syphilitic type; these included sera from patients with malaria, upper respiratory infections, and leprosy, and from healthy persons: about 5% gave inconclusive results. (2) Of 386 sera from syphilitic persons, 95% of the globulin fractions gave positive results of syphilitic type, and 1·8% of biological false positive type, while 3·2% gave inconclusive results. In the case of early primary syphilis, sera with low titres tended to give biological false positive reactions in about half the cases, suggesting that the antibodies first formed differ from those which appear later in the disease. (3) Fifty sera from patients with pinta gave 96% of syphilitic types of inhibition reactions and 4% inconclusive reactions; 9 sera from patients with yaws all gave the syphilitic type. (4) Of 95 sera from presumably syphilitic persons 88% gave a syphilitic type of reaction, 6% a biological false positive type, and 6% inconclusive results.

When the optimum antigen and a highly purified and standardized inhibitor have been found there seems good reason to suppose that the methods described will prove valuable in differentiating true from false positive reactions for syphilis.

T. E. Osmond

Biologic False Positive Reactions in Serologic Tests for Syphilis. VI. Partial Purification of the Antibodies of Syphilitic Human Sera by Adsorption on Freshly Precipitated Calcium Phosphate. PUTNAM, F. W., VOLKIN, E., CRAIG, H. W., and NEURATH, H. (1947). *Amer. J. Syph.*, **31**, 457.

Serum globulins can be adsorbed on to calcium phosphate. For this purpose the optimum calcium ion concentration was found to be 0·0375 M, the optimum dilution of serum 1 in 8, the optimum *p*H 8 to 8·5; the precipitate of calcium citrate formed when the calcium phosphate precipitate is dissolved in citrate buffer was dialysed against citrate-saline buffer. The serological titre of this fraction is more than 80% of that of the original syphilitic serum, the supernatant containing 10 to 15%.

In order to separate the gamma globulin from the remaining adsorbed protein components recourse was had to fractional precipitation of the eluate of the calcium phosphate precipitate with ammonium sulphate. Considerable loss of serological activity occurs during this process, but the resultant subfraction is more active per mg. of protein than either whole serum or the proteins adsorbed on calcium phosphate precipitate.

The adsorption procedure was applied to a number of syphilitic and biological false positive sera and to their respective salt-precipitated fractions G I and G II; in the case of syphilitic sera 85% of the total titre is associated with the fraction adsorbed on and eluted from the calcium phosphate precipitate, whereas in the case of biological false positive sera little or no activity could be

found, and the same applied to their more active globulin fractions.

The experiments suggest that there is a difference between the antibodies of syphilitic and false positive sera, but the relative complexity of the procedure and the loss of titre occurring in the final step of subfractionation render the method unsuitable for the routine testing of sera. *T. E. Osmond*

Clinical Nephropathies in Early Syphilis. THOMAS, E. W., and SCHUR, M. (1946). *Arch. intern. Med.*, **78**, 679.

Syphilitic involvement of the kidneys, especially in the secondary stage, has long been recognized but is very rare. In only 12 (less than 0·3%) of all the cases of secondary syphilis treated by the authors in 1940–6 were there markedly abnormal urinary findings which responded rapidly to antisyphilitic treatment. Ten patients were women. The 3 cases described in detail occurred in young negroes [but there is no indication whether syphilitic renal disease is relatively more frequent in negroes].

Albuminuria may be mild or very heavy with numerous casts; red blood cells are present in variable numbers and may cause frank hæmaturia. The cases can be grouped into those of nephrosis and nephritis, but the dividing line is indistinct. In early syphilitic nephrosis there is heavy albuminuria (10 to 30 g. daily), usually with numerous waxy casts but few or no red blood cells, and oliguria. Renal function is rarely impaired, and the non-protein nitrogen of the blood is not raised. Plasma protein level is normal and œdema is slight or absent in most cases. Ten of the 12 were classified as cases of nephrosis rather than of nephritis. The patients have usually no subjective complaints, and the albuminuria is found on routine investigation. The abnormal urinary findings disappear rapidly with antisyphilitic treatment, and only 1 patient gave a Herxheimer reaction, in spite of which the renal disturbance quickly improved.

Early syphilitic nephritis is distinguished from the nephrotic syndrome chiefly in that there is a relatively mild albuminuria with a much greater hæmaturia. Two cases are described, of which one simulated the focal rather than the diffuse type of glomerulonephritis, with heavy hæmaturia, moderate albuminuria, and numerous granular casts, but no subjective complaints, hypertension, anæmia, or loss of renal function. The other patient had a typical attack of diffuse glomerulonephritis with moderate albuminuria, mild hæmaturia, hypertension, some anæmia, and impaired renal function. It was associated with secondary syphilis, and both conditions responded rapidly to penicillin. The authors admit that syphilis may not have been the true cause of the nephritis, but in view of the parallel response to specific therapy it appears more than likely. In contrast, 3 cases are mentioned in which secondary syphilis was contracted by patients known to have nephritis, and in whom there was no response of the renal condition to antisyphilitic treatment. These early syphilitic nephropathies do not appear to leave any permanent renal damage. *E. G. Sita-Lumsden*

GONORRHŒA (Therapeutic)

The Treatment of Gonorrhea with Streptomycin. CHINN, B. D., PUTNAM, L. E., TAGGART, S. R., and HERWICK, R. P. (1947). *Amer. J. Syph.*, **31**, 268.

The possible large-scale appearance of penicillin-resistant gonorrhœa (laboratory and clinical reports of this condition are quoted) led the authors to assess the value of streptomycin against the gonococcus. A pilot study of 4 cases gave encouraging results, and a larger series was treated to determine optimum dosage. A single dose of 0·5 g. produced cures consistently in 25 cases, as did 0·4 g. and 0·3 g. in further series of 10 and 15 patients respectively. Twenty patients were cured out of a series of 22 receiving 0·2 g., but the other 2 responded to a further injection of 0·2 g. The streptomycin was given in aqueous solution as a single injection into the gluteal muscle; reactions were negligible. Some patients complained of pain for several hours at the site of injection. In 2 patients typical Herxheimer reactions occurred, and both subsequently gave a positive response to serological tests for syphilis. While penicillin at present remains the treatment of choice for gonorrhœa, it is valuable to know that, if penicillin-resistance develops, streptomycin should prove an effective alternative. *S. M. Laird*

Treatment of Acute Gonococcic Urethritis with Single Subcutaneous Injections of Penicillin in Beeswax-Peanut Oil. FROST, D., ALLENDE, M. F., KIRBY, W. M. M., and GINSBERG, H. S. (1947). *Amer. J. Syph.*, **31**, 300.

The report (*J. Amer. med. Ass.*, 1945, **129**, 940) that more regular absorption with prolongation of effective blood levels is achieved with the subcutaneous than with the intramuscular injection of penicillin-beeswax-peanut-oil mixtures led the present authors to test the former route of administration. A standard commercial penicillin-beeswax-peanut-oil mixture containing 300,000 units of penicillin per ml. was used. Of 360 soldiers with acute gonorrhœa receiving 1 ml. of the mixture subcutaneously in the outer aspect of the thigh, 200 were studied for a minimum of 21 subsequent days. Observation was clinical, and by smear and cultural examinations on the seventh, fourteenth, and twenty-first days after treatment. Cure was achieved in 177 patients (88·5%); the authors did not consider this result superior to those obtained by similar treatment given intramuscularly. [No studies of the blood levels achieved by either route are mentioned.] Indurations and nodules formed in 10% of patients treated by subcutaneous injection, and 3 patients developed sterile abscesses. These reactions were most marked in patients receiving the injection into the skin, and were least likely to occur with deep subcutaneous injection. *S. M. Laird*

A Comparison of the *In vitro* Susceptibility of the Gonococcus to Penicillins G and X. ROMANSKY, M. J., and ROBIN, E. V. D. (1947). *Amer. J. Syph.*, **31**, 271.

The susceptibility of different strains of gonococci to various preparations of penicillin was tested *in vitro* by the serial dilution tube and the plate methods. The two methods gave parallel results and therefore both are considered reliable. The plate method is technically superior because several strains can be tested on the same plate and all plates remain under standard conditions throughout. Of 53 strains tested 79·2% were susceptible to 0·0156 to 0·0313 units of commercial penicillin, while in another group of 41 strains 80% were susceptible to 0·02 units per ml. No difference in susceptibility to commercial penicillin was noted between strains from untreated and sulphonamide-fast patients. Forty-one strains were tested against penicillin G and three batches of penicillin X; no difference in susceptibility was noted. *S. M. Laird*